

DEFINITIONS AND SPECIAL INSTRUCTIONS

1. Scope of survey

This survey covers the manufacture of semi-conductors, printed circuit boards, connectors, capacitors, and other electronic components (except relays), in the United States.

2. Figures to be reported

Companies with more than one establishment manufacturing the products covered by this survey are requested to complete a separate report form for each location. If you have not received a separate form for each of your establishments, please call the contact shown on the report form or write to the U.S. Census Bureau for additional forms.

a. Quantity and value of shipments

The figures on quantity and value of shipments should include the physical shipments of all products sold, transferred to other establishments within your company, or shipped on consignment, whether for domestic or export sale. The value represents the net sales price, f.o.b. plant, to the customer or branch to which the products are shipped, net of discounts, allowances, freight charges, and returns. Shipments to your own branches should be assigned the same value as comparable sales to unaffiliated customers, i.e., the value includes an appropriate allocation of company overhead and profit. Products bought and resold without further manufacture should not be included in shipments. For some products, the quantity of shipments is not collected. The unit of measure, as shown in the Reference List is for the quantity of shipments. If "none" is indicated as the unit of measure, only a value of shipments is collected.

Shipments should include the following —

Private brand units as well as your own company brand units.

Leased machines and equipment — For products leased or rented by your company, report the number and estimated value. The estimate should approximate the value of the products sold outright. If no such basis is available, you may use the valuation placed on these items for tax, insurance, or similar purposes.

Do not include the following —

Products manufactured for you by others.

Imports which are reshipped without further domestic manufacture.

Your figure should include —

Electronic components parts (integrated microcircuits, transistors, diodes, rectifiers, capacitors, resistors, coils, transformers, connectors, filters, etc.).

(See Reference List for complete list of products collected on this survey.)

But exclude —

Electric wiring devices (should be reported on survey MA335K, "Wiring Devices and Supplies").

Home entertainment electronic equipment, such as home and automobile radio receivers, television receivers, phonographs, hi-fidelity components, consumer audio and video tape recorders, loud-speakers, microphones, ear phones, phonograph cartridges, and public address systems (should be reported on survey MA334M, "Consumer Electronics").

Instruments, including aeronautical, nautical and navigational, laboratory, surveying, industrial process control, physical properties testing, nuclear radiation detection and monitoring, analytical, and optical should be reported on Survey MA334B, "Selected Instruments and Related Products".

b. Research and development

Dollar shipments should reflect income from development, design, and engineering services performed by the reporting plant in connection with the manufacture of the products shipped, whether included in a single production contract, or contracted for separately, but intended as preparation for the manufacture of the specific products.

Other income from research and development on a contract or fee basis should be reported separately following the appropriate subitem under the section headed "Electronic Research, Development, Testing, and Evaluation," (item codes 9902-9972)

3. Definitions

The product detail for this survey, as shown in the Reference List, is defined according to standard nomenclature for this industry.

RECEIVING TYPE ELECTRON TUBE (Item code 5350) — An electron device used in old time receiving sets in which conduction of electricity is provided by electrons moving through a vacuum or gaseous medium within a gastight envelope.

3. Definitions — Continued

CATHODE-RAY PICTURE TUBE — (Item codes 5661– 5678)
— A cathode ray tube (CRT) used for display purposes to produce an image by varying the electron beam intensity as the beam or beams is deflected to form a prescribed raster.

TRANSMITTING, INDUSTRIAL, AND SPECIAL PURPOSE ELECTRON TUBES (Item codes 5710–5952)

High vacuum tube — An electronic device in which conduction by electrons takes place through a vacuum within a sealed container and which is used for amplification, generation, control, or conversion of electromagnetic energy.

Triode — A three-electrode tube whose defining elements are a cathode for the emission of electrons, an anode for the collection of said electrons, and an interspersed grid for controlling or regulating the number of electrons (current) that flow between cathode and anode.

Diode — An electron tube whose defining elements are a cathode for the emission of electrons, and an anode for the collection of said electrons.

Anode — The positive electrode through which a principal stream of electrons leaves the interelectrode space in an electron tube.

Gas and vapor tube — An electron tube in which the contained gas or vapor performs the primary role in the operation of the tube.

Thyratron — A hot cathode gas tube in which one or more control electrodes initiate but do not limit the anode current except under certain operating conditions,

Microwave tube — An electron tube designed for operation at wavelengths in the range of about 30 to 0.1 cm.

Klystron — A velocity-modulated tube comprising an input resonator, a drift space, and one or more intermediate or output resonators separated by appropriate drift spaces.

Amplifier — A klystron with two or more cavities uncoupled except by the beam, designed primarily for power amplification or generation. Also called power klystron.

Reflex — A single-resonator oscillator klystron in which the electron beam is reversed by a negative electrode so that it passes twice through the resonator, thus providing feedback.

Magnetron — A two-electrode electron tube with a resonant anode structure in which the flow of electrons to the anode is controlled by a combination of crossed steady electric and magnetic fields in such a way as to produce microwave output.

Tunable — A magnetron that can be tuned over a range of frequencies by electronic or mechanical means.

Traveling wave tube (TWT) — An electron tube in which a stream of electrons interacts continuously or repeatedly with a guided electromagnetic wave moving substantially in synchronism with it, and in such a way that there is a net transfer of energy from the stream to the wave.

Forward wave — A wave whose group velocity is in the same direction as the electron in stream motion.

Continuous wave (CW) — A mode of operation in which the RF output energy is not interrupted.

Pulsed power — The mode of operation in which an RF source is successfully turned on and off to provide repetitive pulses of high RF power.

Backward wave — A wave whose group velocity is opposite to the direction of electron stream motion.

Camera tube — A tube for conversion of an optical image into an electrical signal.

Photoemissive — Consists of a glass or quartz tube containing two electrodes, of which the cathode is coated with a layer of photosensitive material; under the action of the light, this layer emits electrons which establish conductivity between the electrodes and are collected on the anode. Also called photoemissive cell.

Image intensifier — An electronic tube in which an image projected on to a photoemissive surface produces a corresponding intensive image on a luminescent surface.

Image converter — An electron tube reproduces on its fluorescent screen an image of the optical image or other irradiation pattern incident on its photosensitive surface.

Photomultiplier — Photosensitive vacuum tubes comprising a photoemissive cathode and an electron multiplier.

Storage tube — An electron tube into which information can be introduced and read at a later time.

Cathode ray tube (CRT) — A display device in which controlled electron beams are used to present alphanumeric or graphical data on an electroluminescent screen.

Special display device — A CRT that forms alphanumeric and symbolic characters on its screen for viewing or recording purposes.

INTEGRATED MICROCIRCUIT PACKAGES
(Item codes 6203–6283)

Integrated circuit (IC) — A microcircuit consisting exclusively of elements formed in situ on or within a single

3. Definitions — Continued**INTEGRATED MICROCIRCUIT PACKAGES***(Item codes 6203—6283) — Continued*

semiconductor substrate, with at least one of the elements formed within the substrate.

Hybrid microcircuit — A microcircuit consisting of elements that are a combination of one or both of these with discrete parts.

Monolithic IC — An integrated circuit consisting exclusively of elements formed in situ on or within a single semiconductor substrate with at least one of the elements formed within the substrate.

Bipolar IC — Semiconductor device used mostly as logic circuits.

Transistor-transistor logic (TTL) — A kind of bipolar circuit logic which takes its name from the way the basic transistor components are interconnected.

Current-mode logic (CML) or emitter-coupled logic (ECL) — Logic in which transistors operate in the unsaturated mode as distinguished from most other logic types which operate in the saturation region. Has very fast switching speeds and low logic swings.

Integrated injection logic (IIL) — It is made with a five mask process without the need for current source and load resistors and can handle digital and analog functions on a single chip.

Microprocessor — An integrated circuit capable of:

1. operation on coded instructions,
2. carrying out, in accordance with the instructions, all of:
 - (a) the acceptance of coded data for processing and/or storage,
 - (b) arithmetic and logical operations on the input data together with any relevant data stored in the internal registers of the microprocessor integrated circuit and/or in external memories,
 - (c) the delivery of coded data
3. accepting and/or delivering signals controlling and/or describing the operation or state of the microprocessor integrated circuit.

Memory — An integrated circuit consisting of memory cells and usually including associated circuits such as those for address selection and amplification.

Random access memory (RAM) — A memory in which access to all storage data can be achieved in essentially the same time, independent of the location. In a multipart

memory, this term refers to that portion of the array which contains the memory cell array and its drivers, sense amplifiers, and control circuitry associated with the normal random access data port.

Read only memory (ROM) — A memory in which the contents are not intended to be altered during normal operation.

Metal oxide semiconductor (MOS) IC — A subcategory of MIS, in which the insulator employed is an oxide of the semiconductor substrate material. The term MOS is often misused to include other categories of insulated-gate technology such as MIS, MNS, and silicon gate (SIS)

MOS memory — A memory using a semiconductor circuit; generally used in high speed buffer memory and ROM.

Dynamic random access memory (DRAM) — These devices are made using dynamic RAM circuit configuration that have data storage that must be refreshed periodically. Also, a read/write memory in which the cell requires the repetitive application of control signals generated inside or outside the integrated circuit in order to retain stored data.

Static random access Memory (SRAM) — A read/write memory in which the data is retained in the absence of control circuits generated inside or outside the integrated circuit.

Metal-oxide silicon read-only memory (MOSROM) — A ROM storage medium that employs metal-oxide silicon transistor (MOST) cells to store binary 1s and 0s.

Erasable programmable ROM (EPROM) — A reprogrammable read-only memory in which all cells may be simultaneously erased using ultraviolet light and in which each cell may be reprogrammed electrically.

Electrically erasable programmable ROM (EEPROM) — A reprogrammable read-only memory in which cells may be erased electrically and in which each cell may be reprogrammed electrically.

TRANSISTORS *(Item codes 6302—6304)*

Transistor — A semiconductor device capable of providing power amplification and having three or more electrodes.

Signal transistor — Device capable of being used up to half a watt.

Power transistor — Device capable of being used at high power ratings.

DIODES and RECTIFIERS *(Item codes 6310—6324)*

Diode — A semiconductor device having two electrodes and exhibiting a nonlinear voltage-current characteristic, used for detection, rectification, switching, etc.

3. Definitions — Continued**DIODES and RECTIFIERS** (*Item codes 6310–6324*) – Continued

Semiconductor rectifier diode (*Item code 6312*) — A semiconductor device that has two electrodes, exhibits an asymmetrical voltage-current characteristic, and is used for current and voltage rectification.

Zener Diode — Alternative name used for voltage-reference diode or the voltage regulator diode.

Voltage reference diode — A diode that is normal biased to operate in the breakdown region of its voltage-current characteristic and that develops across its terminal a reference voltage of specific accuracy when biased to operate throughout a specified current and temperature range.

Rectifier — A device that converts alternating current into a current having a large unidirectional component, such as gas tube, metallic rectifier, semiconductor diode, or vacuum tube.

Selenium rectifier — A device whose essential characteristics are governed by the flow of charge carried within a semiconductor.

SEMICONDUCTORS (*Item codes 6328–6408*)

Semiconductor device — A device whose essential characteristics are governed by the flow of charge carried within a semiconductor.

Solar cell — A photoelectric cell used to convert the radiant energy of the sun into electric power.

Photovoltaic module — A photovoltaic device for generating electricity that is packaged for electrical interface with other electrical equipment.

Light-emitting diode (LED) — A diode capable of emitting luminous energy resulting from the recombination of electrons and holes.

Photodiode — A semiconductor diode in which the reverse current varies with illumination.

Photovoltaic cell — Converts light directly into electrical energy without the need for an external source of current. Used mainly in luxmeters and exposure meters.

Thyristor — A bistable semiconductor device that comprises three or more junctions and can be switched from the off state to the on state or vice versa. NOTE: The term thyristor is used as a generic term to cover the whole range of pnpn-type switches. It may be used by itself for any member of the thyristor family when such use does not

result in ambiguity or misunderstanding. In particular, the abbreviated term "thyristor" is widely used for the reverse-blocking triode thyristor alternately called "silicon controlled rectifier" or "semiconductor controlled rectifier."

Hall effect device — A device in which the Hall effect (the development of a voltage between the two edges of a current-carrying metal strip whose faces are perpendicular to a magnetic field) is utilized.

Chip — A separated part (or whole) of a wafer intended to perform a function or functions in a device.

Wafer — A slice or flat disk, either of semiconductor material or of such a material deposited on a substrate, in which one or more circuits or devices are simultaneously processed and that subsequently may be separated into chips.

CAPACITORS (*Item codes 6608–6782*)

Capacitor — A device consisting essentially of two conducting surfaces separated by a dielectric material such as air, paper, mica, ceramic, glass, or Mylar. A capacitor stores electric energy, blocks the flow of direct current, and permits the flow of alternating current to a degree dependent on its capacitance and frequency.

Fixed capacitor — A capacitor having a definite capacitance value that cannot be adjusted.

Paper capacitor — A fixed capacitor consisting of two strips of metal foil separated by oiled or waxed paper or other insulating material, and commonly rolled together in compact tubular or other form.

Metallized paper capacitor — A paper capacitor in which a film of metal is deposited directly on the insulating paper to serve in place of a separate foil strip.

Dual (film/paper) dielectric capacitor — A dielectric (a material that can serve as an insulator because it has poor electric conductivity) plastic film and paper is used between metal-foil plates of a capacitor to separate the plates electrically and store electric energy.

Tantalum electrolytic capacitor — An electrolytic capacitor that uses tantalum in the form of foil or a sintered slug as the anode, in an acid base electrolyte.

Aluminum electrolytic capacitor — An electrolytic capacitor that uses plain or etched aluminum foil for both electrodes.

Ceramic dielectric capacitor — A capacitor whose dielectric is a ceramic material such as steatite or barium titanate, the composition of which can be varied to give a wide range of temperature coefficients.

3. Definitions — Continued

CAPACITORS (*Item codes 6608-6782*) — Continued

Mica dielectric capacitor — A fixed capacitor that uses mica sheets as the dielectric.

Variable capacitor (Item codes 6752-6762) — A capacitor whose capacitance can be varied by moving one set of metal plates with respect to another.

RESISTORS (*Item codes 6805-6894*)

Resistor — A device designed intentionally to have a definite amount of electrical resistance. Used in circuits to limit current flow or to provide a voltage drop.

Fixed carbon resistor — A resistor that has no provision for varying its resistance value and consisting of particles mixed with a binder, usually molded into a cylindrical shape, and baked.

Variable resistor — A resistor whose value may be changed readily by means of a control knob, to control the current in a circuit. It has one fixed terminal and one that is connected to the sliding or rolling contact. Also called a rheostat.

Wirewound resistor — A resistor employing as the resistance element a length of high-resistance wire or ribbon, usually Nichrome, wound on an insulating form.

Potentiometer — Resistor having a continuously adjustable sliding contact that is generally mounted on a rotating shaft. Used chiefly as a voltage divider.

Varistor — A two-electrode semiconductor device having a voltage-dependent nonlinear resistance. Resistance drops as the applied voltage is increased.

Thermistor — A bolometer that makes use of the change in resistivity of a semiconductor with change in temperature.

COILS, TRANSFORMERS, REACTORS, AND CHOKES FOR ELECTRONIC APPLICATIONS (*Item codes 6922-6956*)

Coil — A number of turns a wire used to introduce inductance into an electric circuit, to produce magnetic flux, or to react mechanically to a changing magnetic flux.

Radio frequency (RF) coil — A coil having one continuous untapped winding, specifically designed to furnish inductive reactance for tuning purposes in a circuit carrying radio frequency (RF) current.

Toroidal winding — One or more turns of wire wound on a doughnut-shape core forming a continuous coil for a

transformer, relay, rotating machine, or other electrical device.

Transformer — A component consisting of two or more coils that are coupled together by magnetic induction. Used to transfer electric energy from one or more circuits without change in frequency but usually with changed values of voltage and current.

Audio transformer or audio frequency (AF) transformer — An iron-core transformer used for coupling between AF circuits.

Filament transformer — A small transformer used exclusively to supply filament or heater current for one or more electron tubes.

Pulse transformer — A transformer capable of operating over a wide range of frequencies, used to transfer nonsinusoidal pulses without materially changing their wave-forms.

Intermediate-frequency (IF transformer) — The transformer used at the input and output of each IF amplifier stage in a superheterodyne receiver for coupling purposes and to provide selectivity.

Reactor — A device that introduces either inductive or capacitive reactance into circuits, such as a coil or capacitor.

Choke — An inductance used in a circuit to present a high impedance to frequencies above a specified frequency range without appreciably limiting the flow of direct current.

Radio frequency (RF) choke — An RF coil designed and used specifically to block the flow of RF current while passing lower frequencies or direct current.

CONNECTORS (*Item codes 6996-7084*) — A complete electric connecting device, consisting of a mating plug and receptacle for cables or of mechanically mating flanges for waveguides.

FILTERS (*Item codes 7142-7152*)

Filter — A selective that transmits a desired range of matter or energy while substantially attenuating all other ranges.

Mechanical filter — A filter designed to separate mechanical waves of different frequencies.

Radio frequency interference/electromagnetic interference (RFI/EMI control filter) — A filter designed to separate unwanted interference of electromagnetic radiation of radio frequency signals into operating circuits.

Electronic wave filter — A transducer for separating waves on the basis of their frequency.

3. Definitions — Continued**PIEZOELECTRIC DEVICES** (*Item codes 7154–7182*)

Piezoelectric device — A device having the ability to generate a voltage when mechanical force is applied, or producing a mechanical force when a voltage is applied.

Oscillator crystal — A quartz crystal that has been cut and polished and which is used to generate a reference frequency in various types of instruments.

Crystal oscillator — An oscillator in which the principal frequency-determining factor is the mechanical resonance of a piezoelectric crystal.

Crystal filter — A electric wave filter employing piezoelectric crystals for its reactive elements.

Crystal blank — The result of the final cutting operation on a natural crystal.

TRANSDUCERS (*Item codes 8402–8592*)

Transducer — A device that converts energy from one form to another, as from acoustic energy to electric or mechanical energy.

Electroacoustic transducer — A transducer for receiving waves and delivering waves to an acoustic system, or vice versa.

Electromechanical transducer — A transducer for receiving waves from an electric system and delivering waves to a mechanical system, or vice versa.

Thermoelectric device — A generic term for thermo-electric heat pumps (a device that transfers thermal energy from one body to another by the direct interaction of an electric current and heat flow) and thermoelectric generators (a device that converts thermal energy into electric energy by direct interaction of a heat flow and the charge carried in electric circuit which requires the existence of a temperature difference in the electric circuit).

PRINTED CIRCUIT BOARD (*Item codes 8602–8637*) — An insulating board serving as a base for a printed circuit. It may include printed components as well as printed wiring, completely processed as far as the printed portion is concerned.

SWITCHES (*Item codes 8727–8737*)

Switch (electronic) — An electronic circuit used to perform the function of a high-speed switch.

Toggle switch — A small switch that is operated by manipulation of a projecting lever that is combined with a

spring to provide a snap action for opening or closing a circuit quickly.

Slide switch — A switch that is actuated by sliding a button, bar, or knob.

Rotary selector switch — A switch that is operated by rotating its shaft.

Keyboard switch — A primary switch on various control panels which when pressed or activated will cause the first part or step of a program cycle or a procedure to begin.

Pushbutton — A master switch that is operated by finger pressure on the end of an operating button.

Snap-action switch — A switch that responds to very small movements of its actuating button or lever and changes rapidly and positively from one contact position to the other. Also called a sensitive switch.

Thumbwheel switch — A rigid circular ring type switch actuated by finger pressure on a control panel.

PRINTED CIRCUIT ASSEMBLY (*Item codes 8751–8790*)

Loaded computer processor boards and board subassemblies for replacement, upgrade, further assembly, or installation in another computer system (including single board computers), by electronics manufacturing services providers/contract assembly companies.

Computer and peripheral printed board assemblies (*Item code 8751*) — Mini-computers, business, personal, mainframes, laptops, key and non-key input, printers, plotters, CRT terminals.

Communications printed board assemblies (*Item code 8753*) — Central office switching equipment transmitters, airborne radio, facsimiles, voice recognition, voice output, modems, carrier inter-faces, LAN'S, land mobile, amateur radio, fixed station, microwave, TV broadcast, radio broadcast, terrestrial/satellite navigation, CATV, pagers, smoke/intrusion detectors.

Industrial process control board assemblies (*Item code 8755*) — Controllers, nuclear reactors, inspection and test, energy management, pollution monitoring, temperature controls, geophysical, meteorological, particle escalators, robotics, semiconductor testing.

Instrumentation printed board assemblies, except industrial process (*Item code 8757*) — Test and measurement, oscilloscopes, field recorders, ATE, auto diagnostics, medical instrumentation, diagnostics, therapeutics, radiology, chronomotographs, spectrophotometers, electromechanical analyzers, lasers, avionics instrumentation.

3. Definitions — Continued**PRINTED CIRCUIT ASSEMBLY** (*Item codes 8751–8790*) – Continued

Search and detection printed board assemblies (*Item code 8759*) — Radar tracking, guidance control, airborne/-marine ground military communication, electronic warfare, jammers, warning receivers, electro-optics, sonar system surface, sonar sub-surface.

Consumer electronics printed board assemblies (*Item code 8761*) — Radios, television, audio equipment, musical instruments, video players, electronic games, garage door openers, home appliances, watches, clocks, personal electronics, cameras.

Plotter controllers (*item code 8766*)

Other electronics printed board assemblies (*Item code 8790*) — Calculators, copying machines, cash registers, electronic gaming, gas pump meters, point-of-sale terminals.

MICROWAVE COMPONENTS AND DEVICES
(*Item codes 8805–8850*)

Attenuator — An arrangement of fixed and variable resistive elements used to reduce the strength of an RF or AF signal by a desired adjustable amount without introducing appreciable distortion.

Cavity — A resonator formed by a volume of propagating medium bounded by reflecting surfaces.

Coupler — A component used to transfer energy from one circuit to another.

Coaxial switch — A switch used with and designed to simulate the critical electric properties of coaxial conductors.

Waveguide switch — A switch designed for mechanically positioning a waveguide section so as to couple it to one of several other sections in a waveguide system.

Rigid waveguide — An inflexible rectangular or circular metal pipe having a predetermined cross-section, specifically designed to guide or conduct high-frequency electromagnetic waves through its interior, or any other equivalent system of material boundaries capable of guiding waves.

Flexible waveguide — A waveguide that can be bent or twisted without appreciably changing its electrical properties.

Parametric amplifier — A microwave amplifier having as its basic element an electron tube or solid-state device whose reactance can be varied periodically by an A.C. voltage at a pumping frequency.

Solid state assemblies — A number of basic parts or subassemblies, or any combination thereof, joined together to perform a specific function whose operation depends on the control of electric or magnetic phenomena in solids.

Magnetic recording head (*Item code 9701*) — A magnetic head used to transform electric variations into magnetic variations for storage on magnetic media.

Magnetic reproducing head (*Item code 9701*) — A magnetic head used to convert magnetic variations on magnetic media into electrical variations.

Delay line (*Item code 9710*) — A device utilizing the time of wave propagation to produce a time delay of a signal.

Oscillators (*Item code 9712*)

Static power supply converter (*Item codes 9740– 9745*) — Electronic devices for transforming electric power.

Electronic cable harness and assembly (*Item code 9750*) — An assembly of insulated wires of various lengths, bent to a pattern and tied together before installation in a piece of equipment.

Cryogenic cooling device (*Item code 9752*) — A device utilizing properties of materials near absolute-zero temperature.

Liquid crystal display (LCD) (*Item code 9766*) — A display made of material whose reflectance or transmittance changes when an electric field is applied.

Magnetic core (*Item code 9770*) — A quantity of ferrous material placed in a coil or transformer to provide a better path than air for magnetic flux, thereby increasing the inductance of the coil and increasing the coupling between the windings of a transformer. Also called a core.

Socket (*Item codes 9804–9805*) — A device designed to provide electric connections and mechanical support for an electronic or electric component requiring convenient replacement.

Electronic control modular chips (*Item code 9810*)

4. Abbreviations and metric conversions

1 inch = 2.54 centimeter (cm)

1 inch = 25.4 millimeters (mm)

5. Comparability

If you also report in the Annual Survey of Manufactures (Form MA-10000), the sum of values for item codes shown in column (a) should correspond to the dollar values reported under product class codes indicated in column (b) below:

Current Industrial Reports (Form MA334Q)	Annual Survey of Manufactures
Item codes (a)	Product class codes (b)
5350 5661 through 5678	3344114
5710 through 5952	3344111
6203 through 6283	3344131
6302 and 6304	3344134
6310 through 6324	3344137
6328 through 6408	334413A
6608 through 6782	3344140
6805 through 6894	3344150
6922 through 6956	3344160
6996 through 7004	3344171
7014 through 7024	3344174
7034 through 7046	3344177
7052 through 7060	334417A
7070 through 7084	334417D
7142 through 7182	3344191
8402 through 8592	3344194
8727 through 8737	3344197
8602 through 8637	3344120
8751 through 8790	334418A
6015	3344117
8805 through 8850	334419A
9701 through 9814	334419D
9810	336322C

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FORM MA334Q		
SEMICONDUCTORS, PRINTED CIRCUIT BOARDS, AND OTHER ELECTRONIC COMPONENTS (SHIPMENTS)		
Product code	Item code	Item description
3344114105	5350	RECEIVING TYPE ELECTRON TUBES (Report quantity in thousands of units) Receiving type electron tubes, all types (including rebuilt)
3344114110 3344114115 3344114120 3344114125 3344114100	5661 5663 5665 5678 5699	CATHODE RAY PICTURE TUBES (Report quantity in thousands of units) Television tubes (include any defective tube that has been rebuilt) Color having a video display diagonal of: 50 cm and under (20 inches and under) Over 50 cm but not exceeding 63 cm (21 through 25 inches) Exceeding 63 cm (26 inches and over) Other includes rebuilt color and new and rebuilt black and white Total cathode ray picture and receiving tubes (Sum of item codes 5350–5678).
3344111105 3344111110 3344111115 3344111120 3344111222 3344111232 3344111265 3344111340 3344111360	5710 5727 5745 5777 5822 5832 5842 5911 5925	TRANSMITTING, INDUSTRIAL, AND SPECIAL PURPOSE ELECTRON TUBES (EXCLUDE XRAY) (Report quantity in thousands of units) Power and special purpose tubes High vacuum tubes, including triodes, multi-grid external and internal anodes, iodes and other Gas and vapor tubes, including thyratrons, ignitrons, gas duplexers, spark gaps and other Klystrons, including amplifier, reflex and other Magnetrons, including pulsed, fixed, tunable, cross-field, continuous wave and other Traveling wave tubes <i>(Report only TWT, do not report packages, power supplies, etc.)</i> Forward wave Continuous wave (CW) <i>(Report quantity in number of units)</i> Pulsed power <i>(Report quantity in number of units)</i> Backward wave <i>(Report quantity in number of units)</i> Light sensing tubes Light emitting devices includes storage tubes (all sizes), cathode ray tubes, color and monochrome (industrial and military), special display devices

REFERENCE LIST — Continued

FORM MA334Q		
Product code	Item code	Item description
		TRANSMITTING, INDUSTRIAL, AND SPECIAL PURPOSE ELECTRON TUBES (EXCLUDE XRAY) — Continued (Report quantity in thousands of units)
3344111370	5952	Miscellaneous special purpose tubes (Report value only) Reference cavities Radiation detection (geiger, neutron counters, etc.) Beam deflection Decade counters Electroluminescent devices (except display devices) Orbital beam Vacuum gauges Vacuum capacitors, switches, relays
3344111100	5999	Total transmitting, industrial and special purpose electron tubes (Sum of item codes 5710–5952) (Value only)
3344117130	6015	Electron tube parts, except glass blanks (Report value only) Bases Getters Cathodes Headers Guns Other
		INTEGRATED MICROCIRCUIT PACKAGES (Report quantity in thousands of units)
		Monolithic integrated circuits, digital, nonsilicon (e.g., gallium arsenide):
3344131136	6203	Memory
3344131148	6205	Logic and other
		Monolithic integrated circuits, digital, silicon:
3344131115	6207	Bipolar transistors, memory:
3344131121	6209	Static read-write random access (SRAM) Other memory
3344131124	6211	Other bipolar transistors, including logic
3344131132	6216	Transistor-transistor logic (TTL) Other (including ECL)

REFERENCE LIST — Continued

FORM **MA334Q**

Product code	Item code	Item description
		INTEGRATED MICROCIRCUIT PACKAGES — Continued
		(Report quantity in thousands of units)
		Metal oxide semiconductor (MOS) field effect transistors:
		Volatile memory DRAMS (dynamic read-write random access):
3344131168	6220	Not over 3MB
3344131170	6223	Over 3MB but not over 15MB
3344131172	6225	Over 15MB
		Volatile memory SRAMS (static read-write random access):
3344131182	6227	Not over 40K
3344131184	6229	Over 40K but not over 80K
3344131186	6230	Over 80K
		Nonvolatile EEPROMs (electrically erasable programmable read-only memory)
3344131192	6237	Not over 80K
3344131194	6240	Over 80K
3344131179	6246	Nonvolatile EPROMs (erasable, except electrically, programmable read-only memory):
3344131180	6249	Other nonvolatile memory
		Other, including microprocessors, controllers, applications specific integrated circuits (ASIC), and programmable logic arrays (PLA):
3344131154	6255	Microprocessors having an internal data bus of 8 bits or less
3344131157	6257	Microprocessors having an internal data bus of 16 bits
3344131160	6259	Microprocessors having an internal data bus of 32 bits or more
3344131133	6261	Other (microcontrollers, ASICS, PLAS, etc.)
		Other digital, silicon, including bipolar combined with MOS
3344131139	6263	Complementary BIMOS (BiCMOS) memory
3344131142	6265	Other complementary BiMOS(BiCMOS), including logic
3344131145	6267	Other digital silicon ICS
		Nondigital silicon monolithic integrated circuits (e.g., linear, analog):
3344131162	6271	Radio frequency
3344131103	6273	Other, analog
3344131106	6275	Other, including mixed signal (analog/digital), logic
3344131109	6277	Other, including mixed signal (analog/digital), other
		Hybrid integrated circuits:
3344131118	6279	Radio frequency
3344131151	6281	Other
3344131112	6283	Other
3344131100	6300	Total integrated circuit packages (<i>Sum of item codes 6203–6283</i>) (<i>Report value only</i>)

REFERENCE LIST — Continued

FORM MA334Q		
Product code	Item code	Item description
		TRANSISTORS (Report value only)
3344134105	6302	Signal (less than 1 watt dissipation)
3344134110	6304	Power (1 watt or greater dissipation)
3344134100	6306	Total transistors (<i>Sum of item codes 6302–6304</i>) (Report value only)
		DIODES AND RECTIFIERS (Report quantity in thousands of units)
3344137110	6310	Signal diodes and assemblies thereof (maximum current 0.5 amps)
3344137115	6312	Semiconductor rectifiers/Power diodes and assemblies thereof (current rating greater than 0.5 amps)
3344137125	6314	Zener diodes (voltage regulator and voltage reference diodes)
3344137105	6316	Selenium rectifiers
3344137120	6324	Microwave diodes (mixers, detectors, varactors, parametric, harmonic generators, etc.)
3344137100	6325	Total diodes and rectifiers (<i>Sum of item codes 6310–6324</i>)
		OTHER SEMICONDUCTOR DEVICES (Report value only) Light sensitive and light-emitting devices
334413A105	6328	Solar cells
334413A110	6333	Photovoltaic modules
		Light-emitting diodes (LED)
334413A115	6342	Discrete, infrared and laser
334413A120	6346	Alpha or numeric displays
334413A125	6352	Photodiodes, including infrared detectors
334413A130	6356	Optical coupled isolators, including sensors and emitters
334413A135	6359	Other light sensitive and light-emitting devices, including photoelectric-magnetic devices

REFERENCE LIST — Continued

FORM **MA334Q**

Product code	Item code	Item description
OTHER SEMICONDUCTOR DEVICES — Continued (Report value only) Other semiconductor devices Thyristors (SCR's, triacs, PNP diodes) All other semiconductor devices Tunnel diodes Thermoelectric semiconductor junctions Metal oxide varistor Solid-state transducers Special semiconductor devices, n.e.c. Semiconductor parts Chips and wafers For integrated circuits (IC's) For discrete semiconductors All other semiconductor parts (headers, packages, heat sinks, other accessories, etc.) Total other semiconductor devices (Sum of item codes 6328–6408)		
334413A140 334413A150	6402 6404	
334413A155 334413A160	6405 6407	
334413A165	6408	
334413A100	6499	
CAPACITORS (Report quantity in thousands of units) Fixed Paper, plastic (film), metalized, and dual (film/paper) dielectric AC types Less than 300 volts 300 volts to 599 volts 600 volts to 999 volts 1000 volts or over Capacitors having a reactive power handling capacity of 0.5 KVAR or less DC types/other Axial lead Radial lead Chips and other leaded devices Tantalum electrolytic Other leaded (molded axial and molded radial)		
3344140103 3344140106 3344140109 3344140112	6608 6612 6616 6620	
3344140215 3344140218 3344140221 3344140331 3344140333	6624 6628 6632 6635 6648	

REFERENCE LIST — Continued

FORM MA334Q		
Product code	Item code	Item description
		CAPACITORS — Continued (Report quantity in thousands of units) Fixed — Continued Aluminum electrolytic 3344140436 6653 Less than 18mm through 35mm 3344140439 6660 Small can style (over 35mm through 51 mm) 3344140442 6664 Other can style (over 51 mm) 3344140445 6668 AC motor start 3344140550 6670 Ceramic dielectric, single layer Ceramic dielectric, multilayer 3344140555 6685 Axial leads and radial leads 3344140560 6722 Chips Other 3344140663 6732 Mica dielectric 3344140666 6742 All other fixed Variable 3344140769 6752 Mica, ceramic or glass dielectric 3344140772 6762 Other 3344140875 6782 Parts of capacitors (including unfinished chips for further finishing and assembly) (Report value only) 3344140100 6797 Total capacitors (Sum of item codes 6608–6782) (Report value only)
		RESISTORS (Report quantity in thousands of units) 3344150104 6805 Fixed carbon resistors, composition or film types Other fixed resistors (power capacity 20W or less) Surface mounted (SMD), having two terminals 3344150208 6818 Flat resistor chips 3344150212 6820 Cylindrical leadless resistors (including metal film, metal oxide, and thick cermet film) Surface mounted (SMD), having more than two terminals (resistor, resistor-capacitor networks) 3344150216 6824 Dual-in-line package 3344150220 6828 Other (including flat packs)

REFERENCE LIST — Continued

FORM MA334Q		
Product code	Item code	Item description
		RESISTORS — Continued
		(Report quantity in thousands of units)
3344150224	6830	Resistor, having two leads
3344150228	6834	Wirewound
		Other (including metal film, metal oxide, and thick cermet film)
3344150232	6842	Resistor networks, having more than two leads
3344150236	6846	Single-in-line
3344150240	6850	Dual-in-line
		Other
		Variable, non-wirewound
		Trimmers
3344150344	6854	Single-turn, carbon, cermet, and other films
3344150348	6858	Multi-turn, carbon, cermet, and other films
3344150359	6869	Potentiometers, precision and panel type
		Variable wirewound
3344150468	6871	Variable wirewound, except potentiometers, including non-precision and trimmers
3344150469	6879	Potentiometers, precision and panel type
		Miscellaneous
3344150576	6884	Varistors
3344150580	6892	Thermistors, bead type, disc, rod
3344150684	6894	Parts (Report value only)
3344150100	6896	Total resistors (Sum of item codes 6805–6894) (Report value only)
		COILS, TRANSFORMERS, REACTORS, AND CHOKES FOR ELECTRONIC APPLICATIONS
		(Report quantity in thousands of units)
3344160120	6922	Audio frequency (AF) transformers
3344160125	6924	Low frequency (LF) chokes
3344160130	6928	Plate and filament transformers (including auto-transformers, except toroidal)
3344160135	6933	Pulse transformers, computer, and other types
3344160105	6936	Radio frequency (RF) chokes
3344160110	6940	Radio frequency (RF) coils
3344160115	6944	Intermediate frequency (IF) transformers
3344160140	6948	Television transformers and reactors (horizontal output, vertical deflection, focus coils, deflection yokes, etc.)
3344160145	6952	Torodial windings (transformers and reactors), except complete magnetic amplifiers
3344160150	6956	Other (balun coils, permeability tuning devices, etc.) (Report value only)
3344160100	6969	Total coils, transformers, reactors, and chokes (Sum of item codes 6922–6956) (Report value only)

REFERENCE LIST — Continued

FORM MA334Q		
Product code	Item code	Item description
		CONNECTORS
		(Report quantity in thousands of connector equivalents)
		Coaxial (RF)
3344171110	6996	Subminiature (SMA, SMB, SMC)
3344171105	7002	Miniature (BNC, PNC, MHB)
3344171115	7004	Other standard and precision
3344171100	7009	Total coaxial (RF) (Sum of item codes 6996–7004)
		Cylindrical
3344174105	7014	Heavy duty and standard
3344174110	7018	Miniature
3344174115	7024	Subminiature
3344174100	7029	Total cylindrical (Sum of item codes 7014–7024)
		Rack and panel (Rectangular)
3344177105	7034	Integral shell, Mil–C–22857 (8434) and similar types
		Subminiature
3344177110	7042	Ribbon (including planar cable type)
3344177115	7044	D-Subminiature (including planar cable type)
3344177120	7046	Microminiatures
3344177100	7049	Total rack and panel (Rectangular) (Sum of item codes 7034–7046)
		Printed circuit
334417A105	7052	Card insertion types
		Two-piece types
334417A110	7056	Post, leader and receptacle type
334417A115	7060	Other two piece types
334417A100	7065	Total printed circuit (Sum of item codes 7052–7060)
		Other connectors
334417D105	7070	Hermetic sealed (except single contact or coaxial types)
334417D110	7072	Plate module types
334417D115	7076	Fiber optic connectors
334417D130	7078	Other connectors, including planar cable (flat conductor or ribbon cable) excluding rack and panel (rectangular types)
334417D120	7082	Miscellaneous special purpose
334417D125	7084	Parts for connectors (connectors requiring further manufacture)
334417D100	7087	Total other connectors, including parts (Sum of item codes 7070–7084) (Report value only)

REFERENCE LIST — Continued

FORM MA334Q		
Product code	Item code	Item description
		ELECTRONIC COMPONENTS AND SUBASSEMBLIES, N.E.C. (Report quantity in thousands of units) Filters, except microwave
3344191105	7142	Mechanical, excluding optical lenses (germanium silicon, fused quartz, rock salt, and other)
3344191110	7144	Radio frequency interference/electromagnetic interference (RFI/EMI) control filters
3344191115	7146	Ceramic dielectric
3344191120	7152	Combination or other dielectric
		Electronic wave filters (LC band and high pass)
		Piezoelectric devices
		Oscillator crystals
3344191225	7154	AT-Cut
3344191230	7162	Other
		Crystals oscillators
3344191235	7164	Oven
3344191240	7166	Temperature-controlled/voltage-controlled (TCXO/VCXO)
3344191245	7168	Hybrid
3344191250	7170	Other
		Crystal Filters
3344191255	7174	Monolithic (include filter crystals and/or monolithic filter units not assembled into filters)
3344191260	7176	Packaged AT-Cut (packaged includes monolithic, tandem monolithic and concrete resonator filter assemblies)
3344191265	7178	Other
		Crystal blanks
3344191270	7180	AT-Cut
3344191275	7182	Other
3344191100	7189	Total crystals, filters, piezoelectric and other related devices (<i>Sum of item codes 7142–7182</i>)

REFERENCE LIST — Continued

FORM MA334Q		
Product code	Item code	Item description
		ELECTRONIC COMPONENTS AND SUBASSEMBLIES, N.E.C. — Continued
		Transducers, electrical/electronic input or output, n.e.c (Report quantity in thousands of units)
3344194105	8402	Electroacoustic Sonar Ultrasonic, vibration, etc.
3344194110	8452	Electromechanical Accelerometers
3344194115	8462	Pressure
3344194120	8472	Strain gauges and other mechanical
3344194125	8512	Thermoelectric (pyrometers, thermocouples, etc.) <i>(Do not report bimetallic, mercury, and other mechanical output types)</i>
3344194130	8592	Other — optical (Specify any not covered under crystal, etc.), chemical, magnetic, nuclear, etc.
3344194100	8599	Total transducers, electrical/electronic input or output <i>(Sum of item codes 8402–8592)</i>
		Printed circuit (wiring) boards (Report value only)
3344120105	8602	Single-sided glass printed boards
3344120210	8604	Double-sided glass printed boards
3344120315	8606	Multilayer glass printed board
3344120420	8620	Single-sided flex printed boards
3344120425	8623	Double-sided flex printed boards
3344120430	8627	Multilayer flex and rigid/flex printed boards
3344120432	8628	Back-bared flex printed boards
3344120433	8629	Sculptured flex printed boards
3344120435	8630	All paper/mat/composite printed boards
3344120440	8631	Other substitute printed boards
3344120545	8637	Receipts for contract work on printed boards (including etching, dip-soldering, drilling, imprinting, etc., but not printed board assembly)
3344120100	8639	Total printed circuit (wiring) boards <i>(Sum of item codes 8602–8637)</i>
		Switches for electronic circuitry
3344197120	8727	Slide (including rocker) miniature and subminiature
3344197125	8728	Rotary selector (including lever and jog-lever) miniature and subminiature
3344197130	8729	Keyboard
3344197135	8730	Push button
3344197140	8731	Snap-action

REFERENCE LIST — Continued

FORM MA334Q		
Product code	Item code	Item description
		ELECTRONIC COMPONENTS AND SUBASSEMBLIES, N.E.C. — Continued
		Switches for electronic circuitry — Continued
3344197145	8732	Thumbwheel
3344197115	8733	Membrane
3344197105	8734	Toggle standard type
3344197110	8735	Toggle miniature and subminiature type
3344197150	8736	DIP
3344197155	8737	Other
3344197100	8738	Total switches for electronic circuitry (<i>Sum of item codes 8727-8737</i>)
		Loaded computer processor boards and board subassemblies for replacement, upgrade, further assembly, or installation in another computer system (including single board computers), by electronics manufacturing services providers/ contract assembly companies.
334418A105	8751	Computer and peripheral printed board assemblies
334418A110	8753	Communications printed board assemblies
334418A115	8755	Industrial process control board assemblies
334418A120	8757	Instrumentation printed board assemblies, except industrial process
334418A125	8759	Search and detection printed board assemblies
334418A130	8761	Consumer electronics, printed board assemblies
334418A132	8766	Plotter controllers
334418A135	8790	Other electronics, printed board assemblies: including office equipment and point of sales
334418A100	8798	Total printed circuit assemblies (loaded boards, subassemblies and modules) (<i>Sum of item codes 8751-8790</i>)
		Microwave components and devices except antennas, tubes, and semiconductors (Report value only)
334419A105	8805	Ferrite (including yttrium garnets) microwave components Circulators, all types (permanent magnet) Circulators (electromagnetic) used as switches, modulators, etc. Isolators Phase shifters Other ferrite microwave components Attenuators Equalizers and harmonic suppressors Limiters Mixers Other

REFERENCE LIST — Continued

FORM MA334Q		
Product code	Item code	Item description
		ELECTRONIC COMPONENTS AND SUBASSEMBLIES, N.E.C. — Continued
		Microwave devices, other than ferrite and solid state (Report value only) — Continued
334419A110	8810	Attenuators, dummy loads, high and low power terminations
334419A115	8815	Cavities Amplifier cavities Coaxial tuned cavities Other
334419A120	8820	Couplers (directional couplers, hybrid junctions, etc.)
334419A125	8825	Reactive microwave components, n.e.c. Filters Modulators Phase shifters Limiters Other
334419A130	8830	Switches, coaxial and waveguide
334419A135	8835	Rigid wave guides and fittings Bend and twists Couplings Flanges Other simple waveguide components, n.e.c.
334419A140	8840	Flexible waveguides and fittings
334419A145	8845	Other microwave components, except ferrite devices Coaxial to waveguide and other transitions Duplexers and diplexers, except electric tubes and ferrite devices Holders and mounts for bolometers, diodes, thermistors, etc. Linear and circular polarizers Magnetron test plumbing Rotary joints and sector scan joints Mixer array Shutters Tuners (coaxial and waveguide, E and H plane, stub, slide-screw, etc.) Windows Other
334419A150	8850	Microwave subassemblies Parametric amplifiers Other solid state assemblies (frequency multipliers, harmonic generators, etc.)
334419A100	8859	Total microwave components and devices except antennae, tubes, and semiconductors (Sum of item codes 8805-8850) (Report value only)

REFERENCE LIST — Continued

FORM MA334Q		
Product code	Item code	Item description
		ELECTRONIC COMPONENTS AND SUBASSEMBLIES, N.E.C. — Continued
334419D102	9701	Magnetic recording and reproducing heads including audio, video, digital and instrumentation
334419D120	9710	Delay lines Distributed constant Lumped constant Magnetostrictive Ultrasonic
334419D125	9712	Oscillators, except instrumentation and crystal types
		Static power supplies for electronic applications, sold separately
334419D130	9740	Regulated
334419D135	9745	Other (unregulated, variable frequency, a.c., d.c., converters and inverters, vibrator, etc.) <i>(Report value only)</i>
334419D140	9750	Electronic cable harnesses and cable assemblies <i>(Report value only)</i>
334419D145	9752	Cryogenic cooling devices, (cysostats, etc.) for infrared detectors, masers <i>(Report value only)</i>
334419D150	9766	Liquid crystal displays (LCD) and other liquid devices <i>(Report value only)</i>
334419D155	9770	Magnetic cores <i>(Report value only)</i>
		Electronic parts, n.e.c., and specialized electronic hardware <i>(Report value only)</i>
		Sockets for electronic component insertion <i>(Report value only)</i>
334419D165	9804	Integrated circuit sockets
334419D160	9805	Other including tube, relay, discrete semiconductors, a.c. and d.c. converters and inverters, etc.
336322C119	9810	Electronic control modular chips for motor vehicles
334419D170	9814	All other electronic parts, n.e.c., and specialized electronic hardware (Specify kind) <i>(Report value only)</i>
334419D100	9819	Total electronic components and subassemblies, n.e.c. <i>(Sum of item codes 9702-9814)</i> <i>(Report value only)</i>

REFERENCE LIST — Continued

FORM **MA334Q**

Product code	Item code	Item description
		SELECTED NONMANUFACTURING REVENUES OF THIS ESTABLISHMENT (<i>Report value only</i>)
		ELECTRONIC RESEARCH, DEVELOPMENT, TESTING, AND EVALUATION (Receipts or billings, not reported as shipments of specific products)
9998042	9902	Systems
9998043	9912	Equipment and subassemblies
9998044	9922	Component parts
9998046	9932	Basic scientific electronic research
9998047	9942	Design and engineering services
9998048	9952	Software
9998049	9962	Testing
9998050	9972	Supplies and accessories sold with component

NOTES: